

radius, describe the circular quadrant Lml meeting the straight line in l, and making Dl equal to DL, the side of the rectangle LDKB, so that lK is the sum of the sides DK and DL, extended out in the same straight line. Bisect lK in H, and on H as a centre, with Hl or HK as a radius, describe the semicircle KGL, meeting Ll produced in G; then is DG the side of a square of equal area with the rectangular parallelogram LDKB, and consequently, equal to the given triangle ABC. Upon DG describe the square DGEF, and the thing required by the problem is done.

Demonstration.—Because the base AB is bisected in L, and the straight lines AB and CK are parallel, the rectangular parallelogram LDKB, which is constituted on half the base, is equal to the triangle ABC; for when a parallelogram and a triangle stand upon the same base and are between the same parallels, the parallelogram is double of the triangle; consequently, when the parallelogram subsists on half the base, it and the triangle are equal. Again, because the straight line lK is equally divided in the point H, and unequally in D, the rectangle or product under lD and KD, together with the square of DH, is equal to the square of Hl or HG; but the square of HG is equal to the sum of the squares of DG and DH; therefore, the rectangle under lD and KD, together with the square of DH, is equal to the sum of the squares of DG and DH; from each of these equals take away the square of DH, and there will remain the rectangle under lD and KD, equal to the square of DG; but Dl is equal to DL; therefore, the rectangle LDKB is equal to the square DGEF, and consequently, the triangle ABC has been converted into a square of equal area agreeable to the conditions of the problem.

THE VALUATION OF CARPENTERS' AND JOINERS' WORK.

W_e, long ago, urged the importance of effecting such a change in the mode of measuring and valuing artificers' work, as should lead to a more general adoption of this means of settlement between employers and tradesmen. A work by Mr. Browning, of Stamford, has been recently published, to which, as having this object in view, it seems desirable to direct attention.* We will let the author speak for himself.

"Setting out with the general and acknowledged principle, that, whatever be the variation in the values of work, as depending on changeable and local prices, the average amount of labour and materials in the same examples must in all cases be alike, I concluded that the only permanent and universal guide to correct valuation is a knowledge, by experience or calculation, of the time and materials consumed in each description of work.

With regard to the value of labour only, I found, after having carried my own researches to a considerable extent, that a system, based on the constant quantities of time employed, was long since proposed by Mr. Peter Nicholson, and subsequently extended by writers of more recent date; but whether the other no less important, and certainly more difficult, division of the subject has been similarly treated, I am not aware; and on this ground I venture to offer the following treatise, illustrative, as far as it goes, of the system in question, but capable of extension to numerous examples of ordinary occurrence which hitherto I have had neither time nor opportunity to include."

"In calculating the materials used in the different kinds of joiners' work, I have, as a general rule, reduced the several thicknesses of each description of wood to a standard thickness of 1 inch; the total quantities of which, divided by the contents of the work in superficial feet, give the quantities of inch stuff per foot superficial, whether of fir or oak: these charged at their respective prices, inclusive of the usual allowance for waste and a trifling addition for nails and glue, determine the total value per foot superficial of the materials used. Waste in the length of each piece in cutting off the horns of tenoned joints, is calculated in each example.

In order to avoid the great labour attending

a separate calculation of each description of framing in its several thicknesses, I determined the surface of stiles and rails, and the surface of panelling to a superficial foot; which, multiplied by their respective thicknesses, gave the quantity of inch stuff per foot superficial in each example. For instance: a door, whose surface is 18 feet sup., with 12-6 feet sup. of stiles and rails, and 9-0 feet sup. of panels, contains 70 feet sup. of stiles and rails, and 30 feet sup. of panels per foot superficial: if, then, the example required be 1½ in. thick, with ½ in. panels, the quantity of inch stuff per foot superficial is as follows, viz.:

$$\begin{aligned} 70 \times 1\frac{1}{2} &= 105 \\ 30 \times \frac{1}{2} &= 15 \\ \hline 120 & \text{ feet super.} \end{aligned}$$

And a similar process applied to thicknesses assumed at pleasure, multiplies examples with comparatively little labour."

"When panels of various thicknesses are introduced in the same example, the most correct method of arriving at the quantity of materials, unless by actual measurement of the stuff consumed, is to equalize their thicknesses, and find the quantity of stuff per foot super. by the tables given. Take, for example, a six-panel door, whose two lower panels are 1½ inches and the four upper panels ½ in. thick: it is clear the medium thickness is between ½ in. and 1½ in., but nearer the former (because the surface of the upper panels exceeds that of the other two)—say 1 inch, which cannot be far wrong; then the quantity of stuff per foot super. is the same as when all the panels are of that thickness."

We take an example of his system from "Framed and ledged doors."

"Doors, 7 feet 3 inches x 3 feet 6 in., with stiles and top rail ½ inches, and three ledges 9 inches deep.

INCH STUFF PER FOOT SUPERFICIAL.

Thickness of Boarding.	Thickness of Framing.					If Reboarded or Matched add—
	In.	In.	In.	In.	In.	
1 in.	1.00	1.00	1.00	1.00	1.00	00
2	1.00	1.00	1.00	1.00	1.00	00
3	1.00	1.00	1.00	1.00	1.00	00
4	1.00	1.00	1.00	1.00	1.00	00
5	1.00	1.00	1.00	1.00	1.00	00
6	1.00	1.00	1.00	1.00	1.00	00
7	1.00	1.00	1.00	1.00	1.00	00
8	1.00	1.00	1.00	1.00	1.00	00
9	1.00	1.00	1.00	1.00	1.00	00
10	1.00	1.00	1.00	1.00	1.00	00
11	1.00	1.00	1.00	1.00	1.00	00
12	1.00	1.00	1.00	1.00	1.00	00

His application of the table is as follows:—

"1. Required the value per foot superficial of materials in 2-inch framed and ledged chaise-house doors, filled in with ½-inch rebated boarding. Inch stuff (say) 3½d. per foot superficial.

1.67 + .06 = 1.73 feet super. at 3½d. = 6d. —the value required.

PHOTOGRAPHIC PICTURES.

NEW PROGRESS.

At a recent Thursday evening meeting of the Western Literary and Scientific Institution, a lecture on the chemical influences of the solar rays was delivered by Mr. Robert Hunt. The immediate subject of the lecture was the phenomena of "photography" as exhibited in the daguerreotype, and the numerous sensitive processes now employed for obtaining representations of natural objects by means of the camera-obscure; and also by the more simple method of copying by direct radiation. Among the most interesting of the photographic processes described as being the most simple and certain, was the ebrumotype, discovered by the lecturer. It consists in washing good letter-paper with the following solution:—

Bichromate of potash 10 grains,
Sulphate of copper 20 grains,
Distilled water 1 ounce.

Papers prepared with this are of a pale yellow colour; they may be kept for any length of time without injury, and are always ready for use. For copying botanical specimens or engravings nothing can be more beautiful. After the paper has been exposed to the influence of sunshine, with the objects to be copied superposed, it is washed over in the dark with a solution of nitrate of silver of moderate strength. As soon as this is done a very vivid positive picture makes its appearance; and all the fixing these photographic pictures require is, well washing in pure water.

RAILWAY JOTTINGS.

A "Baker's prophet" of the name of Carr, in a work called "Railroad Imposition detected," published only thirteen years since, or in 1834, declared that "long before the Birmingham is ready, such are the improvements now making in canals, that not only may the charge be expected to be many times less than the railway, but the time now lost will be considerably saved; and as a proof of the impotency of the Manchester and Liverpool to compete with water lines, it has not been able to obtain at the end of three years, three months and a half, much above one-sixth of the whole traffic; nor even that, without a total failure as to profit. But granting the Birmingham secured even one-half instead of a sixth, the income estimated at 92,200, would be reduced to 46,100." The only chance, therefore, for the latter railway in the wagon department, must be confined to goods requiring extraordinary expedition; and these, comparatively, are very few. The Great Western, though probably it may reach as far as Bath from Bristol, after having, like a mole, explored its way through tunnels long and deep, the shareholders who travel by it will be so heavily sick, what with foul air, smoke, and sulphur, that the very mention of a railway will be more than ipsecauanba!" In 1825 (nine years before that time), the *Quarterly Review* had earnestly trusted that Parliament would, "in all the railways it may sanction, limit the speed to eight or nine miles an hour, which, we entirely agree with Mr. Sturges, is as great as can be ventured upon with safety."—Now that we have dipped amongst the prophets, we may remind our readers of one of a somewhat more truthful stamp than the preceding, uttered, too, by a reverend father of the church, as all truthful prophecies might be expected to be. The Rev. Sidney Smith, of facetious memory, predicted that proper means of safety would never be adopted to secure the rescue of railway passengers in cases of extreme peril, especially from fire, until a bishop should happen to be burnt. Now this prophecy or prediction seems to be on the fair way towards fulfilment, inasmuch as no bishop has yet been burnt, and no efficient means, accordingly, have as yet been adopted for the total prevention of such accidents. But will it be credited by those who have not yet been convinced of the fact, that a right reverend bishop who has both stirred up and had to withstand a good deal of the fire of red-hot ire in his time, namely, Bishop Philpotts, of Exeter, was on Saturday week within an ace of being burnt alive in an incipient *auto da fe*, got up by a "rude fragment of iron irritating by violent and incessant attrition the excitable wood which composed the door of the carriage," in which his Right Reverend Lordship was seated, on his way to Exeter, and which rude instrument of wrath had "ebullied it into a violent heat, which speedily increased till, lo! the fire burst forth, and the wood under the feet of the Right Reverend Lordship was blazing without and intolerable within, where the smoke and burning odour (of the incensed wood of this burning and nearly sacrificial altar) ascended." The Reverend Father in God dashed down the glass, and threw open the doors, and raised his voice, and cried aloud for help; but the terrible shriek of "hell in harness," his own very nostrils breathing flame, and the rushing sound of the whirling wheels of the "express" completely drowned the reverential uproar in the ears of the guards and engineers, who heard not the slightest murmur till it was all but too late. We earnestly hope we shall have no reason to repent that this living sacrifice was not consummated; that a Bishop has not been burnt; and that now, at length, as if by anticipation, railway companies will be compelled, as we ourselves have so often insisted, to adopt some means by which passengers may communicate with the guards, and these with the engineers, in cases of emergency,—an appeal to which same effect has just been made in *The Times* newspaper on other grounds, relating indeed to the association with passengers in general of those unfortunate beings—the inmates—amongst whom it is a wonder we have not now the melancholy duty to chronicle him who has thus been so providentially "pucked like a brand from the burning."—A point of considerable importance to railway workmen and employers was raised at the last

* A proposed system for the more ready and correct valuation of Carpenters and Joiners' Work, as depending on the Price and Quantity of Materials used. By H. B. Browning, of Stamford. Printed in Stamford. A very creditable specimen, by the way, of provincial typography.